



An MQ-9B SeaGuardian unmanned maritime surveillance aircraft flies over Independence-class littoral combat ship USS Coronado (LCS 4) during U.S. Pacific Fleet's Unmanned Systems Integrated Battle Problem (UxS IBP) on 21 April 2021. UxS IBP 21 integrates manned and unmanned capabilities into challenging operational scenarios to generate warfighting advantages. (Photo by Chief Mass Communication Spc. Shannon Renfroe, U.S. Navy)

# Command of the Air?

Michael J. Forsyth

*Whoever controls the air generally controls the surface.*

—Phillip S. Meilinger

American ground troops are accustomed to operating without wondering if the aircraft flying overhead are a threat. In fact, until recently, no soldier has died from enemy air attack since the Korean War.<sup>1</sup> That changed shockingly when three American soldiers were killed in Jordan on 29 January 2024 by an unmanned aircraft (UA).<sup>2</sup> Events involving

unmanned aircraft systems (UAS) and the ongoing wars in Ukraine and Gaza suggest that the notion of gaining and maintaining air superiority is becoming problematic. The inability to unambiguously secure air superiority presents a serious challenge to ground forces. The implications of this challenge require U.S. forces to rethink their previous notions of combat in the air and on the surface. Solutions to this conundrum also require joint concepts with land and naval surface leaders working closely with air domain leaders to develop the concepts. This article will examine the emerging

issue with securing air superiority since the advent of UASs, discuss the implications, and suggest ways that joint force leaders should consider to assure command of the air to facilitate success on the surface.

## Command of the Air—Pre-2020

The first airpower theorists began discussing the need to gain air superiority in the early twentieth century. Writers like Giulio Douhet and Billy Mitchell convincingly argued for the need to gain and maintain control of the skies as a precursor to decisive action on the ground. Later, writers such as Phillip Meilinger and John Warden would expand on the early theorists' ideas, but always adhering to the premise that command of the air is essential to the ability to operate freely on the ground. The first theorist of note was Giulio Douhet, an Italian World War I veteran. He saw airpower as the means to break the stalemate on the ground that characterized World War I. He believed that competing air forces would seek to attack the adversary on the ground to facilitate victory. However, before an air force could conduct attacks on enemy ground forces, it would have to defeat the opposing air force. As he stated in 1921, "There is no practical way to prevent the enemy from attacking us with his air force except to destroy his air power before he has a chance to strike at us."<sup>3</sup> The best way to do this is by "preventing the enemy from flying" to conquer "command of the air."<sup>4</sup> In other words, the most effective way to gain and maintain air superiority is to destroy the enemy air force on the ground.

U.S. Army Air Corps Brig. Gen. Billy Mitchell echoed these thoughts in his treatise, *Winged Defense*. His reasoning for gaining air superiority was his erroneous belief that "no missile-throwing weapons or any other devices have yet been created or thought of which can actually stop an air attack."<sup>5</sup> As a result, "Great contests for control of the air will be the rule."<sup>6</sup> Further, "Once supremacy of the air has been established, airplanes can fly over a hostile country at will."<sup>7</sup> These statements set up his argument for an independent air force.

Mitchell's logic for the need to break the air service away from control of Army leaders was twofold. First, the technology of airpower was so new and transformational that the older generation of Army leaders did not understand the full potential of an air force in war.

Second, because of the lack of comprehension, ground force leaders would misuse airpower as an auxiliary to the army in support of its operations. Mitchell saw this as a waste and advocated for an independent air force that would centrally control all air operations. As he noted, its first mission was to gain air superiority so that it could carry out its second mission, attacking the enemy force and state infrastructure "at will." He stated that "once an air force has been destroyed it is almost impossible to build it up after hostilities commence."<sup>8</sup> Since airmen understood this and the destructive potential of air attack, only airmen were "psychologically fit to develop this new arm."<sup>9</sup> In sum, Douhet and Mitchell believed that once the air force secured control of the air, the friendly force could act with impunity in the air and the Army would then have the initiative to act on the ground free of impediment.

This logic generally held true for decades as the modern theorists echoed the premises of their forebears. Phillip Meilinger's first proposition in his *10 Propositions Regarding Air Power* posits that "whoever controls the air generally controls the surface."<sup>10</sup> As he expounds on this idea he states that "air superiority ... is the first mission of an air force to defeat or neutralize the enemy air force so friendly operations on land, sea, and in the air can proceed unhindered."<sup>11</sup> He further notes along the lines of Mitchell that "Air Power's unique characteristics necessitate that it be centrally controlled by airmen."<sup>12</sup> Therefore, airpower, with centralized command and control provided by airmen, can defeat an enemy air force to facilitate friendly forces in gaining the initiative and a relative advantage on the surface over the enemy.

John Warden takes this a step further. He notes the criticality of gaining air superiority while adding that "no country has won a war in the face of enemy air superiority."<sup>13</sup> For Warden, having air superiority "means having sufficient control of the air to make air attacks—manned or unmanned—on the enemy without serious opposition and, on

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An MQ-1 Predator and an MQ-9 Reaper assigned to the 432nd Aircraft Maintenance Squadron remain ready for their next mission at Creech Air Force Base, Nevada. The two aircraft have provided intelligence, surveillance, and reconnaissance during Operations Iraqi Freedom and Enduring Freedom. (Photo by Staff Sgt. Vernon Young Jr., U.S. Air Force)

the other hand, to be free of danger of serious enemy air incursions.<sup>14</sup> What air superiority does then is enable the air force to conduct a systematic campaign on the surface. Warden then goes on to explain that based on the identified political and military objectives, airmen can develop an air campaign that facilitates attainment of those objectives. He asserts that a thorough analysis and identification of the center of gravity leads to the ability to attack the enemy successfully to secure the objectives.<sup>15</sup> However, successful air operations are only minimally possible without first securing air superiority. To recapitulate, air superiority as defined by the air theorists means that the enemy air force is defeated, which enables friendly forces to act freely on the surface unhindered by enemy air operations.

While this definition held true for many decades, the emergence of a “drone age” has upended this principle.<sup>16</sup> Based upon observations of the rapidly changing character of war, air superiority seems a goal that is now unattainable with the advent of UASs. And,

because of this, securing the initiative and freedom of action on the ground is problematic. The reason for this is that any state or nonstate actor with modest resources can procure adequate UASs to compete in the air, somewhat negating the role of an expensive conventional air force. In other words, command of the air is now contestable thanks to UASs.

### Emergence of the “Drone Age”

The first large-scale use of UASs began early in the twenty-first century. Soon after 9/11, the United States began to use large drones such as the MQ-9 Reaper. These UASs enabled the United States to gather intelligence and conduct lethal attack at medium and high altitudes. Further, the long loiter time, ranging from twelve to twenty-six hours, provided the United States with significant reconnaissance and surveillance capability over a given operational area.<sup>17</sup> These regions included the primary areas of operation during the Global War on Terrorism in Afghanistan, Iraq,

Pakistan, Syria, and Somalia, among others. The use of these drones was viable for long duration missions because of the low threat from air defenses and the complete control of the air exercised by the United States and its coalition partners. The ability to operate large UAs with such freedom from fear of loss constitutes what is known as the “first drone age.”<sup>18</sup> This era came to an end in 2020 as the use of UASs underwent a decisive change in employment in Libya, Syria, and Nagorno-Karabakh.<sup>19</sup>

Ukraine war has seen the wide use of small class I UAs (those with a takeoff weight under 150 kg).<sup>26</sup>

These small UAs contest air superiority in a couple of ways. First, because of their low cost, any state or nonstate actor of meager means can obtain adequate numbers of small drones to affect any sector of the battlefield. Second, since UASs are readily available, these actors can use them for reconnaissance and surveillance, to compress the sensor-to-shooter targeting process, or for direct attack in “kamikaze” fashion.<sup>27</sup>

“ Though in the previous three cases the combatants used large class III UAs, the Ukraine war has seen the wide use of small class I UAs (those with a takeoff weight under 150 kg). ”

With the advent of this “second drone age,” the characteristics of UASs and their usage evolved in such a way that they provided “game-changing” effects and challenged the ability to gain air superiority.<sup>20</sup> According to researchers Spyridon Plakoudas and Vasileios Sofitis from the Royal United Services Institute, the year 2020 “was an *annus mirabilis*” for drone use.<sup>21</sup> In that year, three separate conflicts in Libya, Syria, and Nagorno-Karabakh demonstrated the efficacy of UASs in war. In each case, the drone played a key role in the outcome for the victor and in Nagorno-Karabakh, UAs “transformed the status quo [which was a stalemate] in the Caucasus.”<sup>22</sup> The reason for this is that these drones enabled the entity using them to gain temporary air superiority providing the initiative on the ground to impose its will.<sup>23</sup> Perhaps the most important aspect in the use of drones in Nagorno-Karabakh was the “use of loitering UAVs [unmanned aerial vehicles] with low-cost launch mechanisms in mass against ground assets of the adversary.”<sup>24</sup> The war in Nagorno-Karabakh stalemated early on and became one of attrition until the Azerbaijanis began using the Turkish TB2 Bayraktar drone system to identify ground targets for MAM-L loitering munitions. This broke the stalemate allowing Azerbaijan to gain the upper hand in the war.<sup>25</sup> Yet it is events in Ukraine that point to the changing character of war as a result of the widespread use of drones. Though in the previous three cases the combatants used large class III UAs, the

Further, these small drones operate at low altitudes—defined as under three kilometers above ground level—in large numbers and are able to elude detection to gain precise effects at a given point.<sup>28</sup> Thus, any state or nonstate actor can now compete in the air, contesting the domain to facilitate action on the surface. In essence, a fleet of small UAs provides these actors with an air force-in-being. Therefore, the “second drone age” opens new possibilities and opportunities for any state or nonstate actor to compete effectively in large-scale conventional operations.

Two recent examples of actors with meager resources provide poignant examples of the new possibilities in the employment of drone airpower. The first example is the ongoing conflict in Ukraine. In this conflict, Russia possesses all the advantages, including in terms of conventional airpower. It has a larger population and army, a bigger economy, and a much larger conventional air force. By standard measures, Russia should be dominating the conflict on the ground, on the sea, and in the air. However, this is not the case and one reason, among many, is Ukraine’s skillful use of UASs to contest air superiority and facilitate operations on the surface. Specifically, Ukraine has effectively used UAs for reconnaissance and surveillance and for the attack of ground targets. These drones fly at low altitude and are difficult to detect by radar and other electronic means. They are so small in many cases that conventional air forces cannot intercept. So, Ukraine is able to maintain



Ukraine's 35th, 36th, 37th, and 38th Marine Brigades and the 140th Reconnaissance Battalion receive five sets of equipment from the Come Back Alive Foundation, each consisting of three DJI Mavic 3 Thermal drones, a tablet with a memory card and a pouch, an antenna for signal amplification, fifteen batteries and fifteen flash drives, and a charging station. With the help of this equipment, the marines can more effectively adjust fire and identify enemy positions. The initiative started 30 November 2023 and ended 1 March 2024. (Photo courtesy of the Come Back Alive Foundation)

surveillance and conduct attacks that it would not otherwise be able to without these drones.<sup>29</sup> By using first-person view (FPV) drones, the Ukrainians have shortened the sensor-to-shooter kill chain to stymie Russian attacks, attrit Russian forces, and facilitate local offensive operations.<sup>30</sup> Though Ukraine has fewer resources, the low cost of UASs allows Ukraine to compete in the air, forcing a stalemate on the much stronger Russian forces.

The second example is a nonstate actor, Hamas. This organization has effectively employed UAs to compete with the far more capable Israel Defense Forces in the war that started on 7 October 2023. Israel has one of the best air forces in the world, possesses the vaunted Iron Dome air defense system, and has excellent surveillance and early warning systems. Nevertheless, Hamas has effectively eluded these expensive technological defensive systems to attack

targets in Israel. Hamas leverages FPVs in much the same manner as Ukraine to attack Israeli logistic sites, disrupt their command and control, and as a form of close air support. Hamas also uses these FPVs as a sort of flying improvised explosive device to attack ground targets including destroying the excellent Merkava tanks in documented instances.<sup>31</sup> Before the advent of cheap drones, Israel would have had complete air superiority and never worried about suffering attack from the air, except through missiles and other indirect fires. But the proliferation of cheap, easily obtained UASs allows Hamas to compete in the air domain; whereas, Hamas previously would have ceded this domain to the far stronger Israeli air force. The emergence of the drone age should give the United States and its allies and partners pause as we try to understand the changing character of war in the early twenty-first century.





A 199th Infantry Brigade Experimental Force soldier hand-launches the Rucksack Portable Unmanned Aircraft Systems (RPUAS) on 19 August 2020 at Fort Moore, Georgia, during a named area of interest reconnaissance mission. RPUAS is a short-range reconnaissance drone within a family of aerial systems that span short-, medium-, and long-range reconnaissance. (Photo by Tad Browning, U.S. Army Operational Test Command)

## Implications of the Drone Phenomenon

What we are seeing in conflicts around the world has serious implications for the U.S. Armed Forces and those of its allies and partners. These will require the joint force to consider changes across the doctrine, organizational, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) spectrum. Further, with the pace of change the entire defense enterprise will have to move with accelerated velocity to innovate and gain an edge over potential adversaries. The first implication of the widespread use of UASs is that a large conventional air force is no longer a guarantor of gaining and maintaining air superiority. UASs offer any state or nonstate actor of meager resource means the ability to contest air superiority. Because of this, these actors can then employ the drones to conduct reconnaissance, surveillance, and facilitate ground attack to stymie an

enemy offensive operation or to seize local initiative for relative advantage.<sup>32</sup>

The second implication is that cheap UASs enable any state or nonstate actor the ability to field an air force-in-being. This is a matter of cost effectiveness. The large and technologically sophisticated aircraft and air defense systems fielded by states with vast resources can be countered by small, cheap UASs that are easy to buy off the shelf. A state or nonstate actor can easily obtain these with their constrained resources. Also, a phenomenon seen in Ukraine is where outside entities are known to purchase these on Ukraine's behalf and then donate them in what is called making a "dronation." Some groups are also helping by "crowdfunding" to provide funds for purchase of UASs.<sup>33</sup> What this means for the United States is that it is very wasteful to expend vast resources to counter UASs that are many times cheaper, requiring a rethink of our acquisition model and processes.

The third implication is previously accepted propositions about airpower are now in question. The two most prominent propositions—articulated by Meilinger—that merit reconsideration are “whoever controls the air generally controls the surface” and “air power’s unique characteristics necessitate that it be centrally controlled by airmen.”<sup>34</sup> As noted, a conventional air force that had air superiority conferred an enormous advantage to armies operating on the ground. However, UASs change this because it is now difficult to secure air superiority. Further, “With the use of drone technology, the ‘third dimension’ is no longer an area of operations that is the exclusive domain of air forces.”<sup>35</sup> Now the air “is increasingly used by ground forces for target reconnaissance and the engagement of forces on the ground.”<sup>36</sup> This implies that land force commanders must have a role in the air also.

## Recommendations

The three implications require the U.S. Armed Forces to reconsider ideas that held true until the emergence of use of UASs. The United States must modify how it thinks about war in the air and on the surface through the lens of DOTMLPF since everything from doctrine to organizations and training will need to change. Thus, there are several recommendations that we should consider to adapt to the changing environment. First, the U.S. Armed Forces must redefine what it means to gain and maintain air superiority and the techniques for doing so. This will require new joint doctrinal, technical, and tactical solutions to meet the new challenge. Such solutions require land and air leaders to determine who is responsible for air superiority, at which altitudes, and while assigning a coordinating line to delineate those responsibilities. While many entities such as Army Futures Command are already working on technological solutions such as directed energy and microwaves to counter the UAS threat, the force will have to speed conceptual solutions into the formations with greater velocity. New tactics such as the use of swarms and stacks as seen in Ukraine will need to find their way into tactics, techniques, and procedures manuals and into the training plans of unit organizations.<sup>37</sup> Such a top-to-bottom approach to understanding a new definition of air superiority will internalize it across the force.

A second recommendation to address the implications is to modify the model by which U.S. forces acquire new materiel. The current joint capabilities integration and development system is cumbersome and for some very good reasons such as the prevention of fraud and corruption. However, the pace of change on the modern battlefield requires greater rapidity for acquisitions. Another aspect we must reconsider is cost effectiveness. It is traditional for the United States to pursue the elegant technological solution to solve complex battlefield problems. An example of this is the long, drawn-out acquisition of the F-35 fighter jet. This system provides a critical capability for our national defense. Yet as one author notes, “A single F-35 costs about the same as 55,000 Chinese DJI Mavic 3 drones,” which can saturate the airspace.<sup>38</sup> The ability to concentrate a drone capability can “overwhelm air defenses” to facilitate localized air superiority.<sup>39</sup> This should lead us to question our acquisition model and consider “a cost-efficient balance between cheap platforms that are scalable and a core of advanced platforms.”<sup>40</sup>

The third recommendation that the joint force must consider concerns the implication that airmen must centrally control all air operations. With the proliferation of UASs operated by land forces, it might be time for ground commanders to have a role in the command and control of operations in the air.<sup>41</sup> This could work through some integration of command posts or through a coordination mechanism like altitude separation. Whatever the joint force decides, it must not dither about implementing changes. The force must move quickly to ensure U.S. forces can deal with the threat of mass UAs at low altitudes and to continue operating conventional airpower operating at higher altitudes of airspace.

A fourth recommendation to combat the threat is to change the tables of organization and equipment of ground force and air force organizations to contend with the prevalence of UASs. Because of the “thickening of air traffic,” all units will require UAS operation and counter-UAS operational capabilities.<sup>42</sup> Organizations will need the ability to detect UAs to counter them. Then, these units will have to be able to implement countermeasures to disable them through jamming, spoofing, lasers, or kinetic means.<sup>43</sup> Further, some units—and there are organizations that already

do so—will need to fly UAs as well. These units' purpose would consist of providing reconnaissance and surveillance, conducting ground attack, and even counter-UAS air operations akin to dogfighting. With little appetite for expanding the military to build these organizations, the joint force will have to get creative to build organizations within existing units, utilizing current end strengths and resources.

The final recommendation is that the new dynamic of UAS employment must find its way into professional military education and training. The service members and their leaders will need training and education in the techniques and tactics of employment of UAs on today's battlefield. Further, leaders require an education that forces them to think critically about how to gain and maintain air superiority with the advent of the second drone age. They need this education to be innovative, adaptive, and maintain the edge on the complex battlefield of today.

## Conclusion

The pace of change in the character of war since 2020 should make any observer dizzy. A big part of this change is how combatants are using UASs. Events on battlefields like Libya, Syria, Nagorno-Karabakh, and Ukraine demonstrate that the use of these drones brings into question several propositions about airpower. First and foremost, UASs provide the ability to contest command of the air. Also, the inexpensiveness makes them easily accessible to almost any state or nonstate actor. This somewhat negates massive investment in expensive technology. Because of all these factors, joint leaders need to reconsider the use of airpower through the prism of DOTMLPE. Finally, the leadership must conduct this analysis quickly or the U.S. military risks losing its long-held dominance in the air. This would place service members at war in great jeopardy and such a future is unacceptable. The time is now to reevaluate what it means to have command of the air in the drone age. ■

## Notes

**Epigraph.** Phillip S. Meilinger, *10 Propositions Regarding Air Power* (Maxwell Air Force Base, AL: Air Force History and Museums Program, 1995), 3.

1. *Ibid.*, 4.
2. Zeke Miller, Lolita C. Baldor, and Aamer Medhani, "Enemy Drone That Killed US Troops in Jordan Was Mistaken for a US Drone, Preliminary Report Suggests," Associated Press, 30 January 2024, <https://apnews.com/article/jordan-drone-attack-attack-con-fusion-f175962e058b9b6f668303faf248d8e6#>.
3. Giulio Douhet, *The Command of the Air* (repr., Washington, DC: Air Force History and Museums Program, 1998), 18.
4. *Ibid.*, 19.
5. William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power, Economic and Military* (repr., Mineola, NY: Dover Publications, 1988), 9.
6. *Ibid.*
7. *Ibid.*
8. *Ibid.*, 10.
9. *Ibid.*, 21.
10. Meilinger, *10 Propositions Regarding Air Power*, 3.
11. *Ibid.*
12. *Ibid.*, 49.
13. John A. Warden III, *The Air Campaign: Planning for Combat*, 2nd ed. (Lincoln, NE: Excel Press, 2000), 10.
14. *Ibid.*
15. *Ibid.*, 116–27.
16. Dominika Kunertova, "The War in Ukraine Shows the Game-Changing Effect of Drones Depends on the Game," *Bulletin*

*of the Atomic Scientists* 79, no. 2 (2023): 95–102, <https://doi.org/10.1080/00963402.2023.2178180>.

17. *Ibid.*, 97.
18. *Ibid.* Large drones, according to NATO classification, have a takeoff weight of over 660 kg and can now loiter up to forty hours.
19. Nagorno-Karabakh is the disputed region over which Azerbaijan and Armenia fought a short war in 2020 for control of the area.
20. Spyridon Plakoudas and Vasileios Sofitis, "Explaining the Bayraktar Paradox," *The Royal United Services Institute Journal* 168, no. 6 (2023): 42–43, <https://rusi.org/explore-our-research/publications/rusi-journal/explaining-bayraktar-paradox>.
21. *Ibid.* The Latin term *annus mirabilis* means "amazing year."
22. *Ibid.*
23. *Ibid.*
24. Nestor R. Levin, "The Allure of Technology," Air University News, 9 November 2023, <https://www.airuniversity.af.edu/DesktopModules/ArticleCS/Print.aspx?PortalId=10&ModuleId=25611&Article=3569942>.
25. Simon Anglim, "Azerbaijan's Victory: Initial Thoughts and Observations (and Caveats for the Innovative)," *Military Strategy Magazine* 7, no. 3 (Summer 2021): 13–14, <https://www.militarystrategymagazine.com/article/azerbajjans-victory-initial-thoughts-and-observations-and-caveats-for-the-innovative/>.
26. Kunertova, "The War in Ukraine Shows the Time-Changing Effect of Drones," 96.
27. *Ibid.*, 96–98; Kristen Thompson, "How the Drone War in Ukraine Is Transforming Conflict," Council on Foreign Relations, 16 January 2024, <https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict>.



28. Kunertova, "The War in Ukraine Shows the Time-Changing Effect of Drones," 98–99.
29. German Army Headquarters, *G-7, Learning from Operations: Lessons from the RUS-UKR Conflict*, 1st ed. (Strausberg, DE: G-7 Assessment Evaluation, 2023), 13.
30. Ibid.; Levin, "The Allure of Technology." A first-person view drone is equipped with a camera and wireless transmission capability that allows the operator to view the image in real time from a remote location.
31. Levin, "The Allure of Technology."
32. German Army Headquarters, *G-7, Learning from Operations*, 13.
33. Kunertova, "The War in Ukraine Shows the Game-Changing Effect of Drones," 96; Thompson, "How the Drone War in Ukraine Is Transforming Conflict."
34. Meilinger, *10 Propositions Regarding Air Power*, 1–2.
35. German Army Headquarters, *G-7, Learning from Operations*, 14.
36. Ibid.
37. Kunertova, "The War in Ukraine Shows the Game-Changing Effect of Drones," 97–98; Stacie Pettyjohn, *Evolution Not Revolution: Drone Warfare in Russia's 2022 Invasion of Ukraine* (Washington, DC: Center for a New American Security, February 2024), <https://www.cnas.org/publications/reports/evolution-not-revolution>.
38. Levin, "The Allure of Technology."
39. Kunertova, "The War in Ukraine Shows the Game-Changing Effect of Drones," 97–98.
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